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# Nutritional disorders

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# Overview

- **Multinutrient undernutrition**
- **Specific micronutrient deficiencies**
- **Obesity**

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# What is the calorie

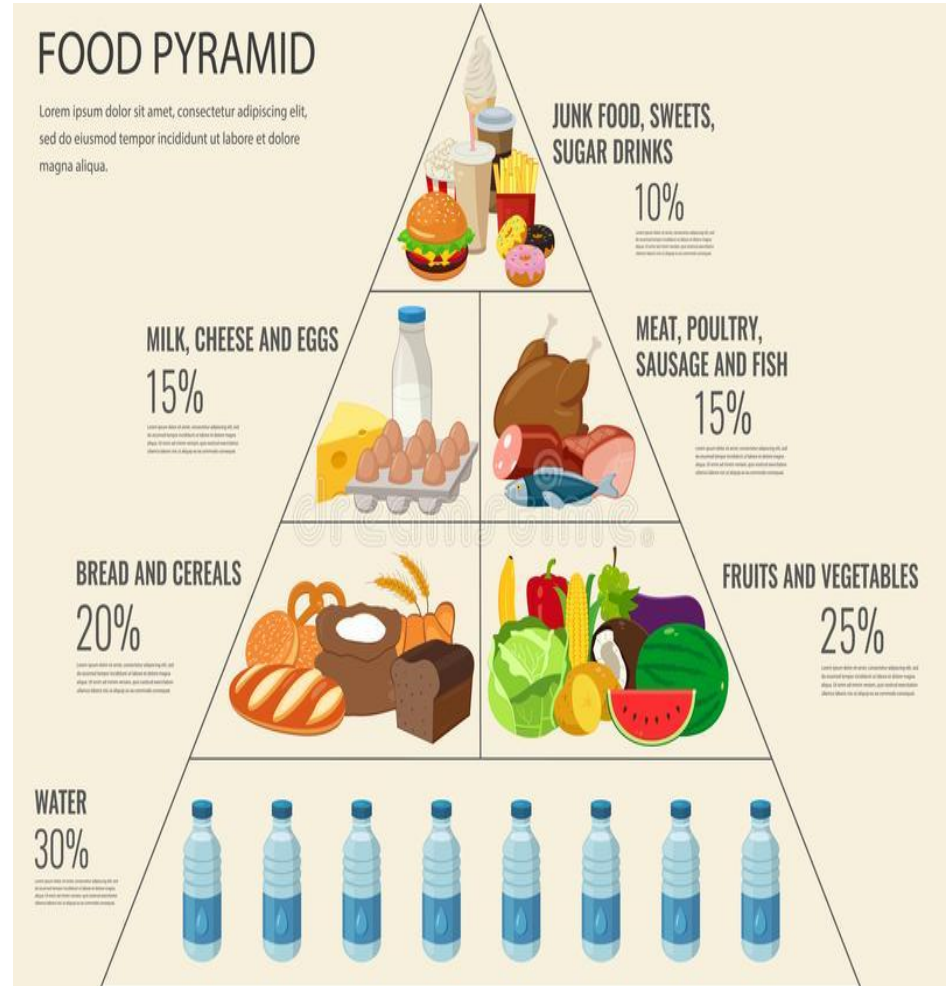
**The calorie** is a unit of energy defined as the amount of heat needed to raise the temperature of a quantity of water by one degree Celsius (or kelvin).

In nutrition, calories refer to the energy people get from the food and drink they consume, and the energy they use in physical activity.

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# Essential Nutrient

- Proteins
- Fat
- Carbohydrates
- Vitamin
- Minerals
- Water

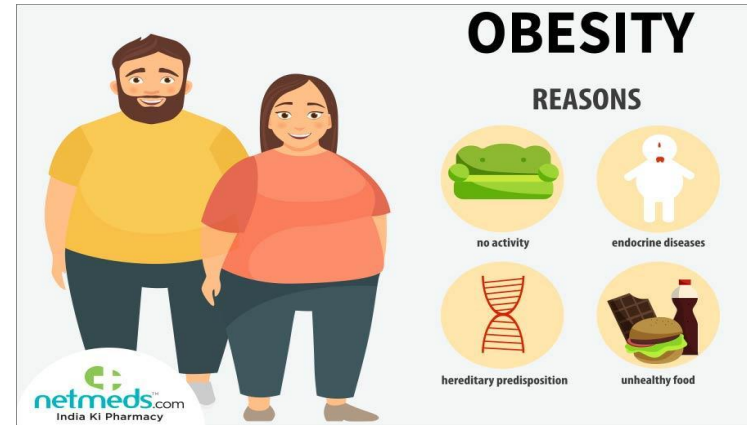


# Nutritional disorders

**Undernutrition**, inadequate intake of one or more nutrients ,Undernutrition is further subdivided into:

1. **Multinutrient undernutrition** (growth failure in the foetus and child)
2. **Specific micronutrient deficiencies**, (iron deficiency,, vitamin A deficiency, and iodine deficiency). Growth is not necessarily affected.

**Obesity**, is caused by energy intake exceeding energy expenditure over a long period leads to weight gain and excess body fat that will increase the risk of other diseases such as cardiovascular disease, hypertension and diabetes.



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# Multinutrient undernutrition

the body has insufficient energy and nutrients to grow or function normally.

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# Multinutrient undernutrition

## YOUNG CHILDREN:

1. A foetus is deprived of nutrients due to maternal undernutrition
2. A young child's diet is inadequate in quantity or quality and/or infection reduces nutrient intake and absorption.

## Significance (0-3 years)

1. **In foetus**,intrauterine growth retardation (**IUGR**) and a low birth weight It increases the risk of morbidity and of poorer cognitive and neurological development (++)CVD,DM)
2. **in young children** impairs **immunity** and increases morbidity and mortality from infectious disease,Chronic undernutrition results in **stunting** (low height for age) and acute undernutrition results in **wasting** (low weight for height). **Underweight** (low weight for age) may be due to stunting and/or wasting .

# Multinutrient undernutrition

## Recognition

- Foetus: birth weight <10th of gestational age / <2500g
- Children: poor growth detected by
  1. Growth chart
  2. Comparing a child's weight or height to a healthy reference
  3. Measuring mid upper arm circumference (**MUAC**)  
Undernutrition is mild if MUAC is <13.5 cm, moderate if <12.5 cm and severe if <11 cm

## Control

- give girls and women a good diet before and during their reproductive years
- **breast-feed** children, exclusively until around 6 months
- give children over 6 months energy/nutrient rich complementary foods 3–5 times/day
- actively encourage young children to eat
- give prescribed micronutrient supplements
- Management of severe undernutrition requires inpatient treatment.



Severe undernutrition presents as **marasmus** (severe muscle and fat wasting), or **kwashiorkor** (bilateral pedal oedema accompanied by muscle wasting )

### kwashiorkor

- swelling of legs (oedema)
- sparse hair
- 'moon face' with little interest in surroundings
- flaky appearance of skin
- swollen abdomen
- thin muscles, but fat present



### marasmus

- normal hair
- 'old man' or wizened appearance
- thin limbs with little muscle or fat
- very underweight body



'XCHANGE INOS'

# SCHOOL-AGE CHILDREN AND ADULTS

- Uncommon,(very poor)
- stunting due to **undernutrition in early life** can lead to undernutrition women of reproductive age and sometimes school-age children and old people.
- **Significance:** impairs **immunity**, reduces **physical** and **mental activity** and causes wasting.
- **Recognition:** best sign is wasting, which, up to puberty.**Body mass index (BMI)** is used for adult
- **Control:** improving diets ,avoiding closely spaced pregnancies ,reducing women's workloads, especially during pregnancy & controlling infection

## Box 9.1: Body mass index (BMI)

$\text{BMI} = \text{weight in kilograms} / \text{height in metres}^2$

An adult is:

- severely underweight if  $\text{BMI} < 16$ ;
- underweight if  $\text{BMI} < 18.5$ ;
- overweight if  $\text{BMI} > 25$ ;
- obese if  $\text{BMI} > 30$ .

Ratios based on arm span instead of height are being developed for old people with kyphosis.

# Specific micronutrient deficiencies

- Iron deficiency and anemia
  - Vitamin A deficiency disorders
  - Iodine deficiency disorders (IDD)
  - Zinc deficiency
  - Folate deficiency
-

# Iron deficiency & anemia

- Inadequate dietary iron results in decreased body iron stores, haemoglobin (Hb) and finally decrease Hb concentration

## Causes :

1. Insufficient bioavailable iron in the diet to cover needs (pregnancy ,infancy ,puberty)
2. Blood loss

## Significance :

Iron deficiency anaemia (IDA) leads to decreased attention spans, learning ability and work productivity. If severe, it increases mortality.

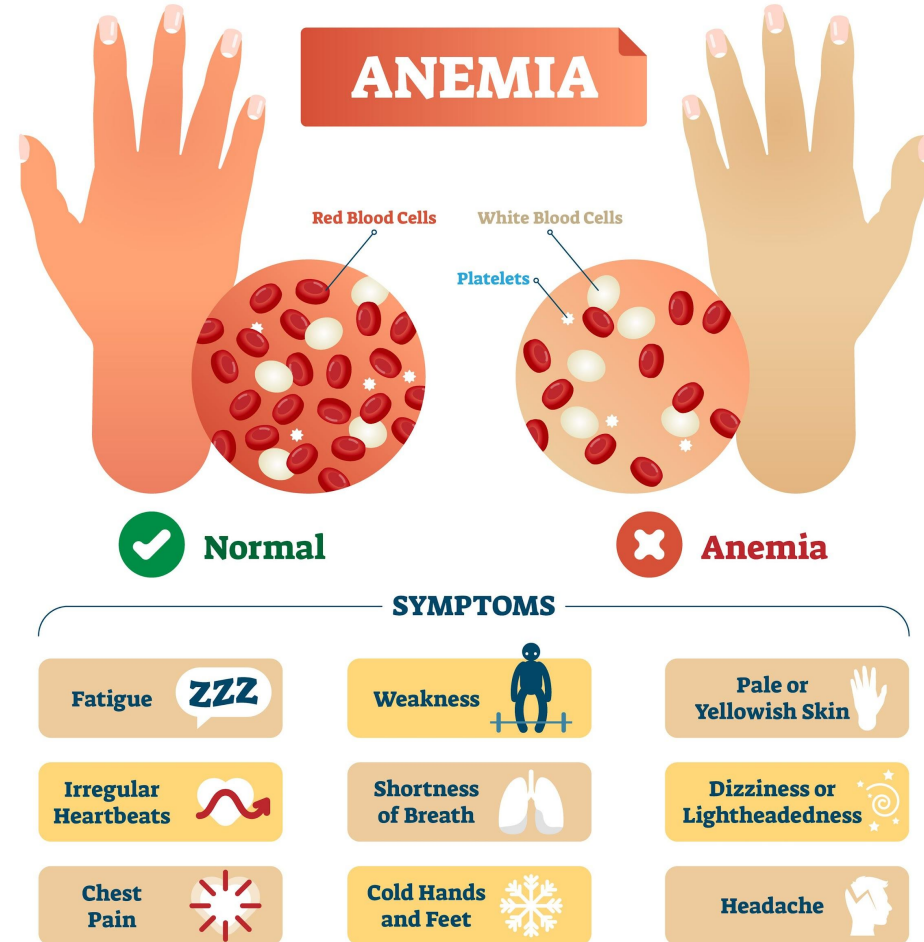
## Recognition :

Anaemia is best diagnosed by measuring haemoglobin or haematocrit.

# Iron deficiency & anemia

## Control :

1. Modifying diets by:
  - increasing intake of haem iron-rich foods
  - increasing intake of absorption enhancers (e.g. vitamin C-rich fruits and vegetables)
  - decreasing intake of absorption inhibitors (e.g. not drinking tea with meals);
1. fortifying foods.
2. Giving supplements of iron, often with folic acid, to priority groups (i.e. women of reproductive age particularly pregnant and postpartum women, and young children especially low birth weight infants). Where IDA is common



# Anemia Symptoms, Causes, Diagnose and more

web: [www.labtestsguide.com](http://www.labtestsguide.com) | Email: [info@labtestsguide.com](mailto:info@labtestsguide.com)

## ANEMIA



### Reasons



unbalanced diet



diseases of the stomach and intestines



blood loss

### Treatment

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed diam nonummy nibh euismod tincidunt ut laoreet dolore magna aliquam erat volutpat. Ut wisi enim ad minim veniam, quis nostrud



1.8 billion people worldwide suffer from anemia

### Anemia prevention products



meat



eggs



liver



sesame

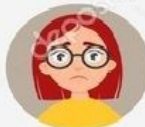


berries



beans

### Symptoms



weakness, fatigue



nail changes



cracked lips



drowsiness



heartache



fragility of hair



dry skin



pallor



# Vitamins A deficiency (VAD)

- Vitamin A deficiency (VAD) occurs when there is insufficient vitamin A in body stores or the diet to cover needs (pregnancy, lactation, young children)
- VAD classified as
  1. subclinical when serum retinol levels are  $<0.7\text{Mmol/l}$  and immunity and other physiological processes are impaired
  2. Clinical (ocular sign = xerophthalmia)

## Significance

- VAD makes children vulnerable to **infections** particularly diarrhoea and measles, and **retards growth** and development. Clinical VAD is the leading cause of **blindness** in young children.

## Recognition

- Subclinical : can not detected
- Clinical: The presence of any sign of xerophthalmia indicates clinical VAD.



**Table 9.4:** Signs and symptoms of xerophthalmia.  
Source: McLaren & Frigg (2001)

Sign/symptom in usual order of appearance	Description
Night blindness	Inability to see in dim light
Conjunctival xerosis	Conjunctiva looks dry and rough
Bitot's spot	Small foamy whitish lesion on conjunctiva – not always present
Corneal xerosis	Cornea looks dry and lacks lustre
Corneal ulcers	May be small or large, often deep
Keratomalacia	Softening of cornea which progresses rapidly and may cause corneal deformation
Corneal scars	Healed sequelae of corneal disease – not vitamin A specific

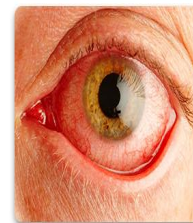
**Table 9.5:** Schedule for oral high doses of vitamin A to prevent VAD.  
Source: McLaren & Frigg (2001) and personal communication

Group	Dose in International Units (IU)
Infants <6 months	
Not breast-fed	50 000 – one dose
Breast-fed but mothers received no supplements	50 000 – one dose
Infants 6–12 months	100 000 every 4–6 months
Children >12 months	200 000 every 4–6 months
Women	
Not lactating	200 000 within 4 weeks of delivery
Lactating but not menstruating	200 000 within 8 weeks of delivery

## Symptoms of Vitamin A Deficiency



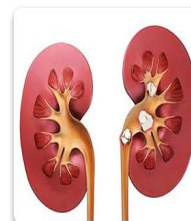
**Vision Changes**



**Cornia dryness**



**Skin changes**



**Kidney Stones**

# Retinol



DAILY NORM



1-2mg



## Products

## Symptoms of deficiency



HAIR LOSS



DIMINISHED VISION



AMENORRHEA



ACNE



REDUCED LIBIDO



FRAGRANCE OF NAILS



CONJUNCTIVITIS  
ARVI



DRYNESS OF THE SKIN



FATIGUE



FISH FAT  
25000mcg(100g)



CARROT  
830mcg(100g)



BUTTER  
680mcg(100g)



LIVER  
6500mcg(100g)



BELL PEPPER  
2100mcg(100g)



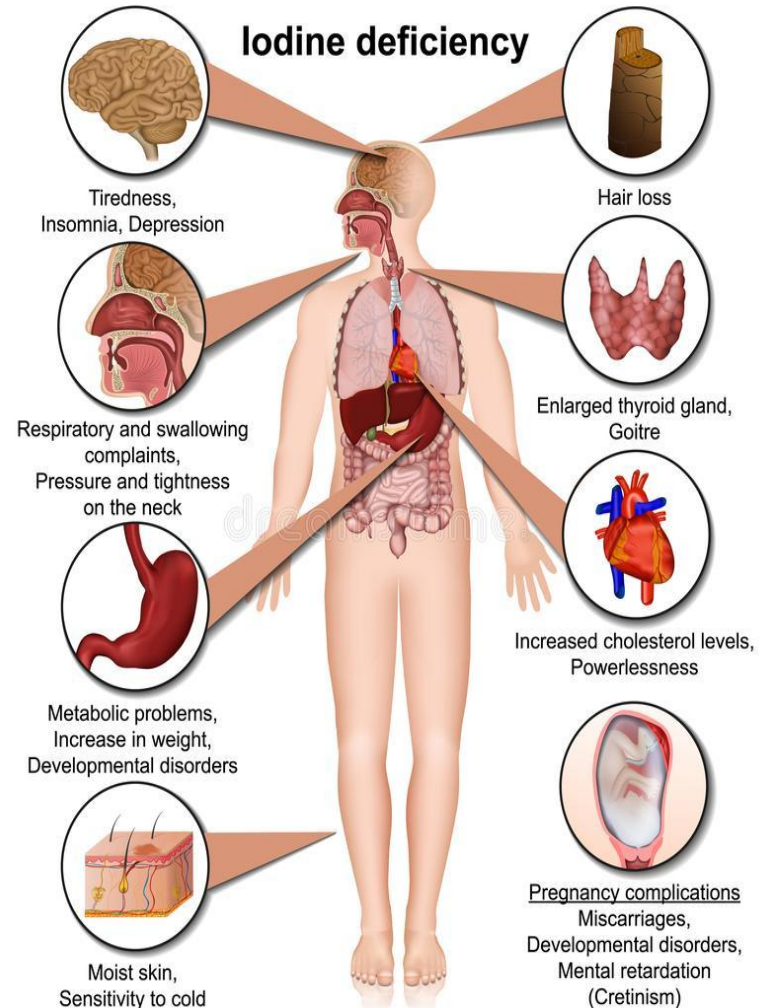
BROCCOLI  
800mcg(100g)



PUMPKIN  
430mcg(100g)

## IODINE DEFICIENCY DISORDERS (IDD)

- **Iodine** is needed to make thyroid hormones; so prolonged iodine deficiency **impairs thyroid function** resulting in lower metabolic rate, lethargy, growth retardation and brain damage.
- **Goiter** occurs when the thyroid gland enlarges in an effort to capture more iodine from the blood.
- Diets in most places are low in iodine unless fortified foods



# IODINE DEFICIENCY DISORDERS (IDD)

## Significance

Iodine deficiency is the single most common cause of mental retardation.

- in 1st and 2nd trimesters of pregnancy it causes varying degrees of irreversible damage to the developing foetal brain and nervous system

- in neonates it causes stillbirth, low birth weight and, occasionally, hypothyroid cretinism;

- in children and adults it cause goitre & hypothyroidism

## Recognition

1. Thyroid volume
2. Ultrasound
3. Urinary iodine

## Control

- Fortifying food. Iodization of salt is by far the most effective.
- Fortifying water.
- Giving oral high doses of iodine where iodized salt is not available

# Other micronutrient deficiencies

## Zinc deficiency

- Zinc promotes **growth** and helps maintain a healthy **immune** system.
- Severe zinc deficiency causes growth retardation, diarrhoea, skin lesions, loss of appetite .

Zinc deficiency is **controlled** by

1. Increasing the intake of foods rich in zinc (meat ,fish,poultry)
2. Giving zinc supplements.

## Folate deficiency

- Folate deficiency is a cause of **anaemia**, especially among women, and may be a risk factor in cardiovascular disease and colon cancer; it is associated with **neural tube defects in the foetus**. It is controlled by increasing intake of folate-rich foods (e.g. liver, pulses, citrus fruit and green vegetables) and giving supplements of folic acid

# ZINC DEFICIENCY

Zn

## Symptoms



UNEXPLAINED  
WEIGHT LOSS



WOUNDS THAT  
WON'T HEAL



OPEN SORES  
ON THE SKIN



DECREASED SENSE  
OF SMELL AND TASTE



WEAK  
IMMUNITY



DIARRHEA



LOSS OF  
APPETITE



LEAKY GUT



THINNING HAIR.  
HAIR LOSS



ACNE  
OR RASHES



IMPAIRED EXERCISE  
PERFORMANCE



MOOD  
SWINGS



POOR  
NIGHT VISION



IMPAIRED BRAIN  
FUNCTIONS



JOINT AND  
HIP PAIN

## Causes



INADEQUATE DIET.  
VEGETARIAN DIET



LACK OF ZINC  
IN THE SOIL



GASTROINTESTINAL  
DISEASES



SICKLE CELL  
DISEASE



PREGNANCY.  
BREAST-FEEDING



CHRONIC  
LIVER DISEASE



CHRONIC KIDNEY  
DISEASE



ALCOHOLISM



MEDICATIONS SUCH  
(diuretics, antibiotics,  
and penicillamine)



GROWTH PERIODS  
IN CHILDREN

# Folic acid



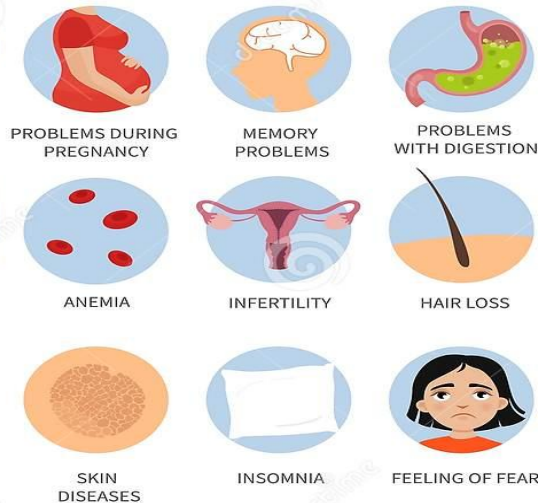
**DAILY NORM**

 **400 mcg**

**C** + **B9**



## Symptoms of deficiency



## Products



**CORN**  
46mcg(100g)



**HAZELNUT**  
68mcg(100g)



**AVOCADO**  
89mcg(100g)



**MANGO**  
43mcg(100g)



**RED CAVIAR**  
50mcg(100g)



**SUNFLOWER SEEDS**  
227mcg(100g)



**PARSLEY**  
110mcg(100g)



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# OBESITY

Energy intake exceeds energy expenditure over a long period

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# Obesity

- Obesity is a condition in which **excess body fat** adversely affects health and increases the risk of other diseases.

## Significance

- In adults, obesity increases the risk of several chronic conditions including type 2 **diabetes**, **cardiovascular** diseases, **gallbladder** disease, **osteoarthritis**, back **pain** and some **cancers**. Obesity in children often leads to obesity later in life and, sometimes, psycho-social problems.

## Recognition

- body mass index **BMI**
- . A **waist circumference** of >94 cm in men and >80 cm in women
- For children, a weight for height of +2 Z scores.

# Obesity

## Control

- eat diets low in fat and high in fibre (i.e. cereals, roots, legumes, fruits and vegetables),
- take regular exercise and avoid too much sedentary

## Patient should try

- Reduce energy intake. Compliance is usually better if reduction is not more than 500 kcal/ day. Crash diets are rarely successful.
- Increase physical activity.

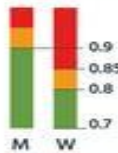
# 01 WHAT IS OBESITY

## WHR

WAIST HIP RATIO

WAIST HIP

35% OVERWEIGHT



11% OBESE



# 04 CAUSES OF OBESITY



Stress



Physical inactivity



Hormonal



Unhealthy food



Medications



Genetics

# OBESITY INFOGRAPHICS

# 02 MEASURING OBESITY

## BMI

BODY MASS INDEX

WEIGHT HEIGHT<sup>2</sup>

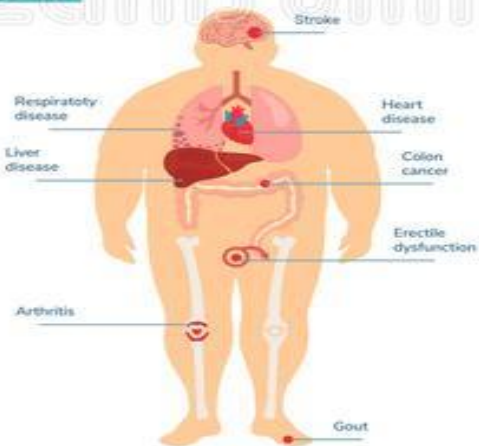


Normal Weight 18.5 - 24.9

Overweight 25.0 - 29.9

Obese 30.0 and above

# 05 CONSEQUENCES OF OBESITY



# 03 HOW TO LOSE WEIGHT

## EAT HEALTHY FOOD



## BECOME MORE ACTIVE



# Obesity

## medical complications

